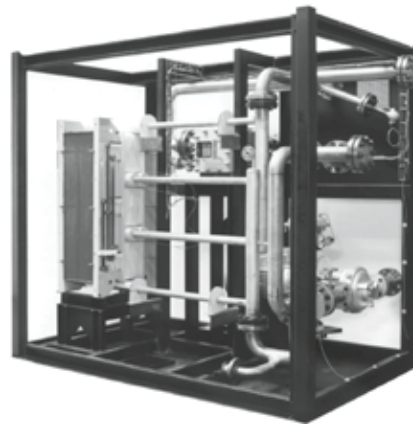
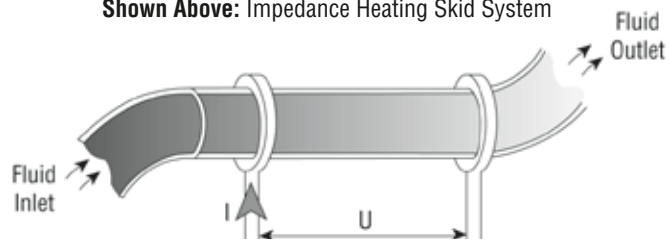


Impedance Heating System

- Uniform, Indirect Heating
- Distances of up to Several Miles in Length
- 1kW to Several MW of Power
- Low Voltage Operation in the Process (less than 50V)
- Temperatures to 1800°F
- Watt Densities up to 190 W/in²
- Hazardous Area Certifications Available



Shown Above: Impedance Heating Skid System



Shown Above: Heat Transfer and Process Liquifications

Description

Impedance style heating, through the Joule effect, uses the pipe itself as the heating source. This allows uniform heating around the process with minimal impact on the installation site.

Application – Heat Transfer & Process Liquifications

Impedance is a unique solution for raising the temperature of a process stream. Impedance uses the pipe itself to transfer heat, so no piping modifications are required. Common applications include fluids that are thermally sensitive and/or highly viscous. An impedance system is also ideally suited for fluids that may solidify in the piping and need liquefied prior to pumping. Impedance can gradually and evenly warm a process, such as paraffin, from a coagulated state to a fully liquid state for pumping.

Application - Heat Tracing and Freeze Protection

Impedance heating is perfectly suited for pipe maintenance temperatures. Applications include processes that require continuous, steady heat input or freeze protection for a fire water pumping system. Another common application is for corrosive environments where direct immersion heating is not desired.

Advantages

- **Accurate temperature control to $\pm 1^\circ\text{F}$** - Available SCR power control can accurately monitor and control desired temperature

- **Uniform Heating** - rather than having localized 'hot spots' for transferring energy, Impedance heating allows for even, smooth heating along the entire circumference and length.
- **Simple Installation** - As compared to electric heating elements, additional piping, valves, wiring, etc are not needed to accommodate Impedance heating. Impedance utilizes the pipe itself and minimizes the amount of equipment needed.
- **Efficient, Compact area for heat transfer** - Impedance heating allows higher watt densities to be used due to increased velocities and lower pressure drops.
- **Indirect Heating Contact** - There are no concerns of corrosion on a heater sheath as the process is only heated by the pipe.
- **Can handle warm up or temperature maintenance conditions** - Impedance heating can be used for simply maintaining pipe temperatures or adding additional power to heat-up liquid flow. Impedance can also be used to liquify coagulated fluids when re-starting a system.
- **No routine maintenance needed** - Impedance has no moving parts that require servicing or that can cause costly shutdowns on operations.
- **No double jacketing** - Steam or oil traced lines have additional hazards of frozen lines, or leaky connections. Impedance totally eliminates these concerns.